

Case Report

Injuries inflicted by a pet ferret on a child: morphological aspects and comparison with other mammalian pet bite marks

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Abstract

Ferrets are becoming more and more popular pets in American homes. Nevertheless, they can cause potentially dangerous injuries, particularly in small children. Based on the case of an infant injured by a ferret, the characteristics of the wounds are described and compared with those of other animals. The potential legal implications are also discussed.

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1. Introduction

Pet animals are very popular in many homes. Dogs and cats are the most frequent, but increasingly more families are buying exotic animals. For instance, the domestic ferret has become the third most frequent pet in the United States. Their number is actually estimated at around 7–10 million. Despite the increasing popularity of these new pets, they can provoke potentially severe injuries, especially in young children. We report the case of an infant bitten by a ferret.

2. Case report

A six-week-old infant was referred to the emergency department of a local hospital by his parents, for facial injuries. The parents explained they had left their child

unattended for a few minutes in his baby seat in the living room. Next to the child was their pet ferret in its cage. On their return, they claimed that the ferret had escaped from its cage, with no clear explanation for this. The infant was immediately transferred to the closest pediatric surgery ward. On admittance, he was conscious and had no fever. Hemodynamic status was stable. Inspection of the skin revealed several contused wounds on the right ear. Physical examination found a cutaneous and cartilaginous irregular wound of the helix, with substance loss, lacerations of the earlobe, superficial cutaneous punctures behind the earlobe, and curvilinear superficial skin erosions in the parotid area (Fig. 1). Wounds were also found on the chin and submental area (Fig. 2). Clinical examination did not reveal any neurological deficit palsy, and an otoscopic examination showed no penetrating wound of the external acoustic meatus.

The infant was hospitalized. Treatment combined local wound care, closure of the wound using absorbable sutures, antibiotics (aminosids and penicillin A) and intravenous pain relievers. A Pope-Oto-Wick[®] was placed in the

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Fig. 1. Photograph of the child: substance loss of the posterior two-thirds of the right helix, superficial puncture lesions of the right parotid area.



Fig. 2. Photograph of the child: two puncture lesions of the right chin and submental area.

external auditory meatus in order to prevent orificial stenosis. Tetanus toxoid was administered on day 1, as well as an injection of tetanus vaccine.

The rabies status of the ferret was investigated simultaneously. According to the parents, the animal had not been vaccinated. A veterinarian requested a brain biopsy to be performed on the ferret to determine whether or not it was rabid. Unfortunately, this was not possible as the father had thrown the ferret and its cage out of the car window in anger. A rabies vaccination protocol was thus started for the child on day 3.

Due to the parents' confused explanations for the accident, a police investigation was requested at the same time. The legal authorities to whom the case was referred immediately ordered that a medicolegal investigation be carried out. This investigation was opened on day 7. Examination of the child's medical notes revealed that he was born at full term. There was no remarkable past medical history. Physical examination noted a failure to thrive (according to French charts, height at -2 standard deviations). Apart from the described injuries, no other traumatic lesions were found. Psychomotor development was normal.

As the ferret had not been found, no comparison between the animal's jaws and the bite mark patterns could be made. The distance between the two punctures at the basis of the arch-formed wound in the parotid area (Fig. 1) was 0.8 cm. In a study of predator bite marks,¹ the inter-canine distance of the ferret was measured between 0.7 and 1.4 cm. Moreover, the characteristics of the bite mark were incompatible with a human bite mark, and the maxillary inter-canine width of most common pets, cats and dogs, are, respectively, 0.9–2.2 cm and 2–4.8 cm.² The examiner came to the conclusion that the wounds were caused by a ferret, associating punctures due to penetration of the animal's canines in the skin (retroauricular lesions), laceration wounds caused by the cutting edge of the canines (earlobe wounds), bites with substance loss due to crushing by the other teeth (helix wounds), and scratches caused by the animal's claws (parotid area skin erosions). The substance loss from the right ear was evaluated at approximately 60% of the external ear. According to French legal procedures, the examiner estimated the expected damage relating to these injuries to be 7 days of "functional disability". He planned to reevaluate the child after the rabies prevention follow up.

The wounds healed properly, without infection. However, a loss of cutaneous and cartilaginous substance persisted.



Fig. 3. Ferret canines.

Table 1
A review of the literature on injuries inflicted by pet ferrets

References	Case #	Gender/age (months)	Position of the victim at the moment of attack	The ferret	Victim's injuries	Treatment		
						Surgery	Antibiotics and other treatment	Anti-rabies prophylaxis
Paisley and Lauer [4]	1	F (4)	On the ground without supervision	Allowed to roam freely	Linear bites and scratches on left side of face	39 sutures	Intravenous	No
				No anti-rabid immunization	Diffuse erythema and left periorbital edema			
				Ten days of observation by veterinarian	Subconjunctival hemorrhage			
Paisley and Lauer [4]	2	F (3)	In her crib	Allowed to roam freely	Lacerations and puncture wounds of the face	Hospitalized for 12 days	Intravenous	Not mentioned
				Unknown rabid status	Substance loss: 40% of both helixes		Vaccination and anti-tetanus toxoid	
				Killed by the child's father		Wound debridement		
				Brain biopsy: non rabid		Reconstructive surgery later		
Paisley and Lauer [4]	3	M (1,5)	In his crib	Allowed to roam freely	Left ear bite	Reconstructive surgery requested	None	Non mentioned
				Unknown rabid status				
Applegat and Walhout [6]	4	F (4)	In her car seat	Free to roam in the back of the car	Multiple lacerations around the eyes	Reconstructive surgery	Orally	Non mentioned
Applegat and Walhout [6]	5	M (60)	Sleeping	Escaped from cage Parents had to pry the ferret's mouth open to release child	Lacerations of the hand Multiple puncture wounds to the hand	No reconstructive surgery	Orally	Non mentioned
Applegat and Walhout [6]	6	F (1)		Allowed to roam freely Family refused to submit the ferret to veterinarian for observation Family moved away to protect ferret	Five wounds to left leg Linear lacerations to both legs	No reconstructive surgery	Orally	Incomplete

The social inquiry led by the National Pediatric Health Protection Task Force did not reveal any other argument in favor of child neglect. The judge thus returned the child to his parents. The first booster of anti-rabies vaccine was given on day 10 and the child was discharged. Treatment at home consisted of simple wound care. The second booster was planned for day 24. The parents were informed that reconstructive surgery on the right ear would be possible, but not before the age of twelve, due to the child's growth.

3. Discussion

There are two types of ferrets in the United States: the domestic ferret (*Mustela putorius furo*) which is sold as a pet, and the North American black-footed ferret (*Mustela nigripes*) which is an endangered species and lives in the wild. Ferrets belong to the Mustelidae family, along with weasels, minks and skunks. The ferret's dentition is composed of 34 permanent teeth, including four very sharp canines (Fig. 3). The claws are non-retractable, grow constantly and are very sharp. Vaccination against rabies and Carré's disease is recommended. Ferrets are not considered dangerous by the Centers for Disease Control or the American Veterinary Medical Association. However, some states, such as California, still ban the owning of ferrets as pets.³

Ferrets are dangerous to man for two reasons: they can cause injury by biting and/or scratching, and they may carry certain contagious diseases^{3–5} like rabies, flu (*Influenzae virus*), tuberculosis (*Mycobacterium tuberculosis*, *bovis* and *avium*), salmonellosis (*Salmonella*), scabies (*Sarcoptes scabiei*), otodectasis (*Otodectes cynotis*), cat flea typhus (*Ctenocephalides felis*), tineas, toxocariasis (*visceral larva migrans*), cryptosporidiosis (*Cryptosporidium parvum*). For certain zoonoses, for example campylobacteriosis (*Campylobacter jejuni*), no human transmission has been noted, but the ferret could be a potential source of contamination.

Few medical articles relate human injuries caused by ferrets (Table 1). Those that are described are severe, and sometimes even fatal.^{4–6} Ferrets attack mostly newborns and young infants incapable of self-defense, often when they are asleep in their crib.⁶ The animal seems to perceive the child as a prey. Ferrets are "escape artists".^{4,5} They are capable of opening their cage without help and escaping. They can attack, even under adult supervision, and can inflict serious injuries very quickly. Bites on children affect mostly the face, in particular the ears and nose. These injuries often require reconstructive surgery.⁴

Few articles have studied carnivorous mammals' bite marks.^{2,7,8} Cutaneous wounds are superficial punctures or lacerations, but the wounds can be cutaneo-cartilaginous when they are inflicted on the extremities of the face (ears and nose). The animal's canines cause either deep puncture wounds or superficial lacerations, depending on the angle with which they penetrate the skin: perpendicular or tan-

gent. Claw scratches cause superficial contuse skin wounds with epidermal erosions.

Ferret bites can be mistaken for those of other rodents, in particular those of the rat. Rats seem to be more fearful and flee if the child screams. They therefore mostly inflict wounds on corpses.^{9–11} Their bites have the common characteristics of post-mortem wounds, which are non-contuse and only slightly hemorrhagic. The lesions are generally round, crater-form, with chewed irregular edges and often substance loss. They are located on exposed and unprotected parts of the cadaver such as eyelids, nose, mouth and hands.

Dogs also cause wounds on children.¹² The wounds are easily distinguishable from those caused by ferrets. They are often complicated by muscular-cutaneous stripping and are much more voluminous. The wounds combine punctures created when the dog grabs its victim in its mouth, cuts due to the prehension by its incisors and substance loss caused by the premolars and molars. The wounds are located on the most accessible parts of the body: the neck and abdomen. Lesions produced by dragging and by lateral shaking of the head may also be present. These are never observed in rodent or ferret injuries.

In the case presented, the parents could be suspected of child neglect according to French penal law, which requires mandatory reporting. They could be charged for "wilful harming or injuring of a child or the endangering of the person or health of a child". Given that they have the custody of the victim child, which is an aggravating circumstance, their conduct is punishable by a two year imprisonment and a 30,000 euros fine. Unintentional acts of violence such as this one generally lead to a "functional disability" of less than three months. But ferret bites can cause mutilations or transmit diseases, in particular rabies (with an incubation of two to three weeks). If the defendant is judged guilty, the court will rule in the victim's civil interests. According to French civil law, resolution of the injury is determined once the wounds have healed or stabilized and are no longer at risk of infection. Should the victim's health status worsen or improve subsequently to the resolution, a new medical investigation can be requested.

4. Conclusion

It is not possible to balance the hazards involved in owning a ferret with those of owning a dog or cat, for lack of sufficient information to quantify the number of bites caused by each of these different animals.^{4,13} Nevertheless, the injuries caused by this small animal can be severe, even fatal on small children. It is rather easy to differentiate ferret bite marks from those of other mammal pets. The injuries they inflict are puncture wounds or lacerations. Bites on children affect mostly the face and may require reconstructive surgery. Apart from injuries, the risk is an exposure to contagious diseases. Parents can be prosecuted for child neglect.

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